SIGMA XI QUARTERLY

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Term expires January, 1927

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Term expires January, 1928

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E. C. Case

SIGMA XI QUARTERLY

EDITORIAL COMMITTEE

FLOYD KARKER RICHTMYER
EDWIN EMERY SLOSSON
HENRY BALDWIN WARD
EDWARD ELLERY

VOL. XIV MARCH, 1926 No. 1

OUR NEW OFFICERS

The election of Professor F. R. Moulton, Professor of Astronomy at the University of Chicago, as President of the Society, brings to the office one whose work exemplifies in a high degree the ideals for which Sigma Xi stands. Professor Moulton is a charter member of the Chicago Chapter, which was installed in 1903. He is the author of several well known books, in addition to a large number of papers which are the result of his own personal investigations. He is a member of the National Academy of Sciences; is Fellow of the Royal Astronomical Society; and is a member of numerous other scientific societies. The Society is fortunate, indeed, to have as its President a scientist of such high standing as Professor Moulton.

Dr. W. R. Whitney, of the General Electric Company, Schenectady, New York, is the new member of the Executive Committee, the election being for a five-year term. Dr. Whitney is a member of the Union Chapter. Since 1901, he has been the Director of the Research Laboratory of the General Electric Company and the impetus which he has personally given to research, not only in industry, in which he has promoted by his own personal efforts both pure and applied science, but in universities, because of his sympathetic interest in scientific investigations generally, is too well known to need comment. His wealth of experience will prove invaluable in assisting the Executive Committee in its direction of the affairs of the Society.

The re-election of Dr. F. B. Utley of Pittsburgh as a member of the Alumni Committee for a five-year term, returns to the Alumni Committee one who has shown unusual interest in the work of the alumni. And the re-election of Dean Ellery as Secretary and of Dean Pegram as Treasurer, needs no comment except to take this

occasion to express to these re-elected officers the gratitude which the Society feels for their invaluable services. F. K. R.

OUR NEW CHAPTERS

We are confident that all members of Sigma Xi, both chapter and alumni, will join us in extending a hearty welcome to the new chapters, New York University and the University of Cincinnati, authorized by unanimous vote of the Kansas City Convention. The research record at both of these institutions augurs well for the success of the new chapters. And it is to be hoped that the older chapters will note carefully the activities of the newer ones which come to chapterhood with the enthusiasm of youth and which, in many instances, have given excellent illustrations of the way in which a chapter of Sigma Xi can be of assistance in promoting research. Witness, for example, the prize recently established by the University of Virginia Chapter, for the best research publication from the University during the year.

If chapters are to be successful, if Sigma Xi is to keep pace, both as regards its opportunities and obligations, with the rapid developments of science, the Society must be much more than an honorary organization—although it is to be hoped that membership will always be prized as a high honor. The Society, the chapters, the individual members, must be constantly on the look-out for new and more effective means for "doing our bit" in "the promotion of research."

Indeed, in order to encourage originality in ways of promoting research, the Society could well afford to offer a prize to that chapter which, during a given calendar year, makes the best suggestion as to activities or methods effective in assisting the institution, at which the chapter is located, in its research program. If the prize is ever offered, it would probably be won by a chapter less than five years old! F. K. R.

OUR GROWING RESPONSIBILITIES

The chapter roll now numbers forty-five. It is probable that the next two or three years will see the number increased to well over fifty. The number of Sigma Xi clubs is likewise increasing rapidly—

a movement which every thoughtful member of Sigma Xi will applaud.

Every one knows that the mere routine associated with an organization increases much more rapidly than the size of the organization, even if the organization undertakes no new activities. Somebody must carry these increasing duties. Accordingly every member of Sigma Xi should heartily endorse the action of the Kansas City Convention, taken as a result of the mandate from the Washington (1924) Convention, in increasing the support for the Secretary's office. Only those who have been closely in touch with our Secretary, can appreciate his heroic efforts in carrying on the constantly increasing routine of his office, in inaugurating the campaign to bring the alumni members into active touch with the Society, and in making the Fellowship movement a success, on the very meagre allowance which the Society was able to make for the work. The new budget, made possible by the small increase in the annual assessment voted at Kansas City, while not adequate to complete the several projects immediately, will nevertheless enable the Secretary to make definite plans for the future, and is, at the same time, a well-deserved vote of confidence in the work which he has so ably and unselfishly done. (The Secretary is in Europe as this is written, and it will be published before he can use his editorial blue pencil!) Incidentally, based on the purchasing power of the dollar, the new assessment is practically the same as those levied twenty years ago.

F. K. R.

MINUTES OF THE EXECUTIVE COMMITTEE MEETING

KANSAS CITY, MO., DECEMBER 27, 1925

A meeting of the Executive Committee of Sigma Xi was held at the Hotel Muehlebach, Kansas City, Mo., December 27, 1925. Those present were: President F. K. Richtmyer, Professor G. W. Stewart, Dr. C. E. McClung, Dr. Henry B. Ward, Dr. Vernon Kellogg, Dean George B. Pegram, Treasurer; and C. E. Davies, Acting Secretary.

The President reported that, as provided in the Constitution, he had appointed a Nominating Committee to make nominations for President, Treasurer, Secretary, member of the Executive Committee, and a member of the Alumni Committee. The committee consisted of Charles S. Howe, W. A. Riley, and P. W. Swain.

The President appointed Professors J. K. Finch and J. H. Morecroft of Columbia University to audit the report of the Treasurer.

Acting Secretary Davies reported that excellent progress was being made in the Secretary's office in revising and reorganizing the records of Society membership. A complete alphabetical list of the twenty thousand names is prepared and a start has been made of a card index of the members arranged geographically.

The Treasurer presented a preliminary report. The complete report appears on page 28 of this issue.

The Alumni Committee reported that the formation of alumni chapters must wait until the geographical index of members is ready.

The report of the Fellowship Committee appeared in the QUARTERLY for June, 1925.

The special committee appointed at the New York meeting to consider the incorporation of Sigma Xi reported as follows:

To the Executive Committee of Sigma Xi:

At the meeting of the Executive Committee on May 2, 1925, Messrs. George B. Pegram, Vernon Kellogg and C. E. Davies were appointed a committee to report on the advantages, costs and recommended place of incorporation of Sigma Xi.

In its development as a Society for the Promotion of Research, Sigma Xi will have increasing financial responsibility. If its program is constructive and the vision of its leaders farseeing, it is not impossible that it may become

the recipient of large donations for research development. As the Society grows and takes its place among other scientific organizations, it must think of a proper endowment for its development. Under all such circumstances it would be of decided advantage for the Society to have the legal and financial standing which incorporation gives. It is, therefore, the recommendation of this committee that Sigma Xi take the necessary steps to become incorporated.

It is possible to incorporate Sigma Xi as an educational institution in several states and in the District of Columbia. Phi Beta Kappa is incorporated under the educational law of the State of New York, because Phi Beta Kappa embarked on an extensive building campaign and the center of this activity is in New York. In view of the fact that Sigma Xi is a national organization whose development will not be confined to one state or one section of the country, incorporation in the District of Columbia is desirable. Requirements for incorporation in the District of Columbia are simple, consisting merely of the filing of the certificate signed by incorporators, the majority of whom are citizens of the District. The expenses of not more than one hundred dollars would be used solely for the employment of suitable counsel.

In view of the foregoing, this committee recommends that Sigma Xi be incorporated in the District of Columbia.

(Signed) C. E. DAVIES
GEORGE B. PEGRAM
VERNON KELLOGG

The Executive Committee accepted the report and referred it to the Convention for authority to proceed.

At the New York meeting a sub-committee was appointed to study the organization of the Society and make recommendations as to changes that would make most effective the efforts of the alumni in carrying forward the purposes of the Society. A progress report by the committee was held for discussion at the Spring Meeting of the Executive Committee.

President Richtmyer and Secretary Ellery presented a code of procedure for the investigating of institutions looking to the granting of charters and the steps necessary to be followed until the officers are elected for the new chapter.

It was voted to recommend to the Convention favorable action on the application from the petitioning group at New York University, and that the charter so granted carry the customary limiting provision regarding the election of undergraduates to associate membership.

It was voted to recommend to the Convention favorable action on the application from the petitioning group at the University of Cincinnati, and that the charter so granted carry the customary

limiting provision regarding the election of undergraduates to associate membership.

The Treasurer and Secretary presented the following recommendation:

> That each chapter treasurer be instructed, when sending check to cover annual assessment or initiation fees, to accompany the remittance with an accurate list with addresses of the chapter members or initiates; and that the national secretary shall make up his chapter rolls and list of initiates from these lists.

This recommendation was accepted by the Executive Committee and referred to the Convention for adoption.

The importance of having suitable secretarial assistance and the need for adequate compensation for the secretarial staff was brought out in the discussion of the budget. In accord with this need the following budget was adopted for submission to the Convention with the recommendation of the Executive Committee that the annual assessment be one dollar for each chapter member.

	1925	1926
QUARTERLY	$ 800	$1200
Secretary's salary		1200
Secretary's office expenses	3000	2400
President's office expenses	100	100
Traveling expenses of Executive Committee	450	450
Engrossing charters	120	120
Traveling expenses of officers	400	400
	$4870	$5870
Carried by Alumni Fund		600
		$5270

The Executive Committee

VOTED: That the Convention be asked to authorize the Executive Committee to appoint an official jeweler and that all Keys be issued only through an official order from the Secretary just as associate emblems are now issued.

President Richtmyer pointed out that there were a large number of Sigma Xi Clubs that did not have a definite status and that the procedure for their organization was not clearly stated. The Executive Committee accordingly

VOTED: That Messrs. Richtmyer and Davies be appointed a sub-committee to formulate procedure for the organization and conduct of Sigma Xi Clubs.

Dr. McClung pointed out that the present constitution permits the election by institutional chapters of alumni members from the faculty of neighboring institutions where there is no chapter. He pointed out that there was no provision for alumni associates from neighboring institutions. The Executive Committee requested Dr. McClung to recommend a policy for the election of alumni associates for consideration at the Spring Meeting of the Executive Committee.

The desirability of securing continuity of service by having the President serve as a member of the Executive Committee for two years after his term as President expires was recognized by the Executive Committee and accordingly it requested Dr. Richtmyer to formulate the necessary change in the Constitution to accomplish this for consideration at the Spring Meeting of the Executive Committee.

C. E. DAVIES, *Acting Secretary.*

PROCEEDINGS OF THE TWENTY-SIXTH CONVENTION OF THE SIGMA XI

KANSAS CITY, MO., DECEMBER 29, 1925

The Twenty-Sixth Convention of the Society of the Sigma Xi was held in the Kansas City Athletic Club, Tuesday, December 29, 1925.

President Richtmyer called the business session to order at two in the afternoon and appointed the following Committee on Credentials: Professor F. E. Kester, Kansas; Professor Robert B. Bean, Virginia; Professor R. R. Ramsey, Indiana. The Committees received the credentials of the delegates and reported the following chapters represented at the Convention:

Cornell	B. P. Young
Rensselaer	G. H. Carrigan
Kansas	F. E. Kester
	G. C. Shaad
Yale	C. S. Leonard
Nebraska	R. H. Wolcott
Pennsylvania	C. E. McClung
	J. R. Kline
Iowa	A. O. Thomas
Stanford	G. M. Smith
Chicago	C. H. Cowles
	Paul MacClintock
Michigan	G. R. LaRue
Illinois	H. B. Ward
	W. A. Noyes
Indiana	R. R. Ramsey
	F. M. Andrews
Missouri	H. Schmidt
Colorado	Francis Ramaley
University of Washington	J. E. Guberlet
Purdue	M. W. Gardner
Washington University	W. L. Upson
Texas	J. M. Kuehne
	E. H. Sellards
Mayo Foundation	T. B. Magath
North Dakota	E. A. Baird
Kentucky	M. N. States
Virginia	I. F. Lewis
	R. B. Bean

In addition there were representatives present from the following Sigma Xi Clubs:

Oklahoma	C. E. Decker
	H. L. Dodge
Arizona	A. F. Hemenway
	D. T. MacDougall
Kansas Agricultural	R. A. Seaton
Carleton	C. A. Culver
Denver	T. R. Garth
Michigan Agricultural	R. P. Hibbard
New York University	H. W. Stunkard
Washington State	H. E. Culver
Florida	G. F. Weber

The following officers and members of the Executive Committee were present:

President	F. K. Richtmyer (Cornell)
Treasurer	George B. Pegram (Columbia)
Executive Committee	Clarence E. McClung (Pennsylvania)
	Henry B. Ward (Illinois)
	Vernon Kellogg (Washington)
	C. E. Davies (New York, Alumni Rep.)

The proceedings of the 1924 Convention held in Washington, D. C., were approved as printed in the Quarterly for March, 1925.

In his brief report as President, Doctor Richtmyer announced the appointment of C. E. Davies to act as Secretary during the extended absence of Dean Edward Ellery in Europe. The President stated that fifteen applications for charters were in the hands of the Executive Committee and announced that the Executive Committee had codified the procedure of granting charters for the guidance of petitioning groups.

Acting Secretary Davies reported that the membership records in the Secretary's office had been revised and a complete alphabetical list completed. Geographical lists are in the process of being compiled. These will be of inestimable value in conducting campaigns for alumni contributions to the research funds and in organizing groups of alumni throughout the country.

Dean Pegram read the Treasurer's Report which was referred to an auditing committee appointed by the President and consisting of Professors J. K. Finch and J. H. Morecroft. (See page 28.)

As Chapter Reports are printed in the QUARTERLY as received the time allowed for hearing Chapter Reports was given over to representatives of the nine Sigma Xi Clubs who were present. They presented short statements of the work that each Club is doing in stimulating research and in promoting acquaintanceship among workers in science.

The major portion of the Convention business came as recommendations from the Executive Committee. The first recommendation was that steps be taken to incorporate Sigma Xi in the District of Columbia. This recommendation was unanimously passed by the Convention.

The second recommendation was to the effect that each Chapter treasurer be instructed when remitting the annual assessment or initiation fees to the Treasurer to accompany the remittance with an accurate list with addresses of the Chapter members or initiates from which the National Secretary shall make up his Chapter rolls and lists of initiates. This recommendation was adopted with the amendment that addresses will be given only where changes in addresses must be indicated.

Under existing conditions it is possible for any individual to secure a Sigma Xi key from any jeweler since the Society has no authorized jeweler and no uniform method of issuing keys. The Executive Committee, therefore, recommended that the Society appoint an official jeweler and that all keys be issued only through an official order from the Secretary just as associate emblems are now issued. This recommendation was unanimously adopted with the amendment that the date of its enforcement be left to the discretion of the Executive Committee. This amendment was made to protect local jewelers who may have a stock of keys. To further protect the emblem it was moved and unanimously carried that the matter of copyrighting Sigma Xi emblems be referred to the Executive Committee with power.

President Richtmyer explained the procedure by which petitioning groups at various institutions submitted their application for a chapter. This procedure includes preliminary correspondence, the submission of information about research activities and research personnel, it embodies a visit to the institution by one of the national officers, and if the situation is generally favorable, the petitioning group is advised to proceed with the preparation and printing of a formal petition. Upon favorable action on this petition by the

Executive Committee the petition is presented to the Convention for official action. In accordance with this procedure the Executive Committee recommended to the favorable consideration of the Convention petitions

1—From the group at New York University
2—From the group at the University of Cincinnati.

The Convention took the following action:

1—Upon the roll call of the Chapters represented, it was voted unanimously to grant a charter to the group of petitioners from New York University, with the limitation that undergraduates should be elected to associate membership only.

2—Upon the roll call of the Chapters represented, it was voted unanimously to grant a charter to the group of petitioners from the University of Cincinnati with the limitation that undergraduates should be elected to associate membership only.

In accord with the request of the 1924 Convention at Washington, the Executive Committee presented a recommendation that the assessment for the year 1926 be one dollar per chapter member. The formal recommendation of the Executive Committee as it appeared in the September, 1925, issue of the QUARTERLY was presented to the Convention. A motion was made that this recommendation be tabled, which was lost by a vote of 11 to 8. A motion that the assessment for the year beginning January 1, 1926, be seventy-five cents per member and for the year starting January 1, 1927, be one dollar per member was lost by a vote of 15 to 4. The recommendation of the Executive Committee was then passed by a vote of 17 to 2. Cornell and Nebraska being opposed and Indiana, Kentucky and Chicago not being represented when the vote was taken.

The Report of the Nominating Committee was then presented as follows:

For President—Professor F. R. Moulton of Chicago Chapter.
For Secretary—Dean Edward Ellery of Union Chapter.
For Treasurer—Dean George B. Pegram of Columbia Chapter.
For Member of Executive Committee for a term of five years—Dr. W. R. Whitney of Union Chapter.
For Alumni Committee for five-year term—Dr. F. B. Utley of Yale Chapter.

Respectfully submitted,
(Signed) CHARLES S. HOWE,
W. A. RILEY,
P. W. SWAIN,
Nominating Committee.

The Report of the Nominating Committee was unanimously adopted.

The Convention voted its sincere appreciation to President F. D. Farrell of the Kansas State Agricultural College, for his lecture entitled "A Desert Becomes a Garden" which he presented at the joint session of Sigma Xi and the American Association for the Advancement of Science.

The Convention also voted to express its sincere appreciation to Mr. A. P. Learned of Kansas City, who acted as Chairman of the Local Committee in making arrangements for the Convention, for the Annual Dinner and the Annual Public Lecture.

Dr. H. B. Ward, Past-President of Sigma Xi, expressed the appreciation of the Society for the splendid services of President Richtmyer during his term of office and acted as Chairman during a rising vote of thanks from those present.

The Convention then adjourned to meet at the City Club for the Annual Dinner.

Annual Dinner

One hundred and seventy-five members and guests of Sigma Xi met at the City Club at 6:30 p.m. for dinner. At the close of the dinner, President Richtmyer called upon Doctor Henry B. Ward, Professor H. W. Stunkard of New York University, Professor Nevin M. Fenneman of the University of Cincinnati, President F. D. Farrell of Kansas Agricultural College and President-Elect F. R. Moulton of the University of Chicago.

Adjournment was then taken to the auditorium of the Junior High School for the fourth Annual Sigma Xi lecture, which was delivered by President Farrell, of the Kansas State Agricultural College on the subject, "A Desert Becomes a Garden."

A DESERT BECOMES A GARDEN

By F. D. Farrell

In addressing a meeting held under the joint auspices of the American Association for the Advancement of Science and the Society of Sigma Xi, it is a pleasure to base my remarks on some incidents in American history. I believe that the incidents to which I shall refer will serve to indicate something of the value, to our country and to humanity, of the kind of work that is done by those who compose the membership of the two organizations.

During the past eighty years this country has witnessed a transformation which, in kind and in magnitude, probably has no equal in history. It is the transformation of an area of several hundred thousand square miles of land from what once was universally regarded as a desert to what is now one of the important areas of food products and of population in the Western Hemisphere. The "Great American Desert" of the early nineteenth century has become a large contributor to the world's food supply and the home of millions of civilized people.

Early Nineteenth Century Descriptions

Many of the histories written during the first four decades of the nineteenth century contained references to the "Great American Desert." The boundaries of this "desert" were vague and variable but its unreclaimability was definitely accepted. A geography, written by Woodbridge and Willard,[1] and published in 1824, has this to say of the region:

"From longitude 96°, or the meridian of Council Bluffs, to the Chippewan mountains is a desert region of four hundred miles in length and breadth....On approaching within one hundred miles of the Rocky Mountains, their snow-capped summits become visible. Here the hills become more frequent, and elevated rocks more abundant, and the soil more sterile, until we reach the abrupt chain of peaks which divide it from the western declivities of North America. Not a thousandth part can be said to have any timber growth, and

[1] Barrows, William, "The United States of Yesterday and of To-morrow," 1883, page 102.

the surface is generally naked.... The predominant soil of this region is a sterile sand, and the large tracts are often to be met with which exhibit scarcely a trace of vegetation.... Agreeably to the best intelligence we have, the country, both northward and southward of that described, commencing near the source of the Sabine and Colorado, and extending to the northern boundary of the United States, is throughout of a similar character.... There is little probability that it can ever become the residence of an agricultural nation."

Other geographies and geographic articles, published during the next ten or twenty years, contain similar descriptions. In 1843 the *Edinburgh Review* published an article[2] in which reference was made to the same general region in the following words:

"There lies the desert, ...except in a few spots on the borders of the rivers, incapable, probably forever, of fixed settlements. This is the great prairie wilderness, which has a general breadth of six hundred or seven hundred miles, and extends from south to north...nearly fourteen hundred miles, ...so complete in the character of aridity that the great rivers—the Platte, Arkansas and Rio Grande—after many hundred miles of course through the mountains, dry up altogether on the plains in summer, like the streams of Australia, leaving only standing pools of water between wide sandbars.... With these internal obstacles between we cannot but imagine that the world must assume a new face before the American wagons make plain the road to the Columbia as they have to the Ohio."

As late as 1858, an article in the *North American Review*[3] spoke of the Missouri River as the eastern boundary of a "vast desert nearly one thousand miles in breadth, which it was proposed to traverse, if at all, with caravans of camels..."

Lieutenant Z. M. Pike, who commanded two government exploring expeditions into the region, in 1805–1807, spoke optimistically of an important benefit which he thought the country could expect to obtain from the "Great American Desert:"[4]

"From these immense prairies," he said, "may be derived one great advantage to the United States; namely, the restriction of our population to some certain limits, and thereby a continuation of the union.

[2] Barrows, William, "The United States of Yesterday and of To-morrow," 1883, page 104.

[3] *Ibid.*, page 133.

[4] Expeditions of Lieut. Z. M. Pike, Appendix II, quoted by Barrows, *loc. cit.*, page 97.

Our citizens being so prone to rambling and extending themselves on the frontier, will, through necessity, be constrained to limit their extent to the west to the borders of the Missouri and Mississippi, while they leave the prairies, incapable of cultivation, to the wandering and uncivilized aborigines of the country."

The Desert Has Become a Garden

The states of Kansas and Nebraska are located approximately midway between the north and south boundaries of what was known eighty years ago as the "Great American Desert." The present status of things in these two states is approximately representative of the region. There are differences, of course, both north and south of the two states, but these differences are not vital in the present discussion.

Kansas and Nebraska together now contain more than three million people. Last year they harvested crops from more than forty million acres of land, an area equal to that of the six New England states. These crops were worth more than eight hundred million dollars. Besides this they had about five hundred million dollars worth of livestock. The people of the two states are using nearly a million motor cars, or practically one for each three people. The fact that they support eleven hundred newspapers is some evidence of their desire to be informed. Further evidence is supplied by statistics of college attendance. Four years ago the two states were equal in the number of students they sent to college for each thousand of population. In this respect they ranked fourth among the states of the union. At the same time, the state of Massachusetts ranked twenty-first. This year Kansas is sending a larger proportion of its population to college than it sent four years ago, and Nebraska probably is doing the same. This is not a bad showing for the prairies which Pike said would have to be left to "the wandering and uncivilized aborigines of the country." The desert of Pike and his contemporaries has become a garden.

"Great American Desert" Not Wholly Mythical

Of course, we now know that much that was written about the region in the early nineteenth century was pure myth. Some of the historians of that day were somewhat imaginative or else they were credulous of the reports made by explorers who were more adven-

turous than scientific. But when the numerous inaccuracies of the early histories and geographies have been discounted, there still remains the fact that the region was essentially unreclaimable, in the light of the knowledge then in the possession of the American people and with the facilities then available in this country. From this point of view, the region was a desert. The tragic experiences of thousands of early settlers, who attempted reclamation, supplied abundant evidence of this fact. It is pertinent to ask what has brought about the change.

One of the explanations commonly made forty years ago was that settlement was always followed by an increase in the water supply. Major Powell[5] stated positively that stream flow increased when settlers came. "An important fact," he said, "has been uniformly observed—in the first years of the settlement the streams have steadily increased in volume. . . . The increase is abundantly proved; it is a matter of universal experience. Observations of the writer thereon have been widely extended." But Major Powell questioned the common belief that the increase in stream flow was caused by increase of local rainfall. On the other hand, a General Morrow, of the United States Army, is quoted[6] as having said in 1888, in a speech delivered at a fair in western Nebraska, that the rainfall at Camp Douglas, Utah, more than doubled between 1861 and 1874, and as concluding that settlement actually did increase precipitation. The observations of Powell and Morrow doubtless were correct so far as they went, but subsequent experience has shown that some of their conclusions were erroneous. Nevertheless, the conclusions were accepted at the time as indicated by at least one historian, William Barrows.[7] The rainfall all over the West, and especially in the Great Plains, is extremely variable. For example, the annual precipitation at the Kansas State Agricultural College during the past sixty-five years, has ranged from fifteen inches to fifty inches. Similarly wide variations in annual rainfall are characteristic of the whole region. For this reason, observations covering short periods are almost certain to be inadequate. The long time records of the Weather Bureau give no indication that there is any tendency for

[5] Powell, J. W., "Lands of the Arid Region of the United States," 1878, page 89.

[6] Barrows, William, "The United States of Yesterday and of To-morrow," 1888, page 131.

[7] *Ibid.*, page 129.

the rainfall to increase. The change-of-climate theory will not do as a way of explaining the transformation from desert to garden. That theory is held stubbornly by many intelligent people, but their belief that there have been essential changes in the climate of the Great Plains since the time of the white settlement is not supported by the stubborn facts of the case.

What, then, will account for the change? I believe that the evidence justifies the statement that it has been brought about through the application, by an indomitable people, of the results of research in agricultural and mechanical science. Patient research in field and laboratory and exploration of every country in search of useful plants have produced new facts, new plants and new machines. These have been eagerly taken up by a people having the spirit of the pioneer and their use has been fruitful.

Natural Peculiarities of the Great Plains

The Great Plains region was settled chiefly by people from the northeastern part of the United States—from north of the Potomac and the Ohio and east of the Mississippi. The settlers of the latter region came predominantly from Northwestern Europe. When they came they brought their agricultural traditions with them, as usually happens in great human migrations. These traditions included farming methods and crop plants. If we except Indian corn and tobacco, the agriculture of the Northeastern United States was essentially Northwestern European in character. That type of agriculture was successful because the natural conditions in the Northeastern United States are very similar to those in Northwestern Europe. Such important crops as oats, potatoes, soft wheat, clover and many of the grasses grown for pasture or for hay, did as well in the Northeastern United States as they did in Northwestern Europe. Moreover, these crop plants could be produced satisfactorily by the early American settlers along with the Indian corn which the settlers found here.

But when settlement reached the western bank of the Missouri, it encountered an essentially different complex of natural conditions. This was particularly true of the rainfall. The rainfall of the Northeastern United States is fairly copious and is relatively evenly distributed throughout the twelve months of the year. In the region that was formerly known as the "Great American Desert," that is

to say, in the Great Plains, the annual rainfall is lower in quantity than is the rainfall farther east. What is more significant is that in the Great Plains region the distribution of the rainfall is essentially different from that in the Northeastern states. Instead of having a relatively even distribution throughout the year, the Great Plains region has almost no rainfall during the winter months. Most of the rain comes in this region between April 1st and November 1st. Moreover, even in the months of highest average rainfall, there frequently are periods of severe drouth. A curve showing the monthly distribution of the rainfall in New England is merely a slightly wavy line, which is approximately horizontal from January 1st to December 31st. One showing the monthly distribution in Ohio, New York and Pennsylvania is very similar to that for New England. But the corresponding curve for a large part of the Great Plains area is, roughly, the outline of a cone, with the apex in the months of June and July. The difference between the types of rainfall distribution in the Great Plains and in the Northeastern states can also be indicated by the statement that the wettest month in Cincinnati or Baltimore receives less than twice as much rain as the driest month, while the wettest month in North Platte or Concordia receives more than eight times as much rain as the driest month. The Great Plains region characteristically has almost rainless winters, and a high percentage of sunshine throughout the year. Most of its rain falls during the crop-growing season, and even that part of the year is characterized by frequent periods of acute drouth, with high temperatures and wind causing excessive evaporation and hence accentuating the difficulties with which crop plants have to contend. It would be difficult to over-emphasize the importance of this difference between Great Plains, on the one hand, and the Northeastern United States, on the other. The difference is undoubtedly the dominant factor in determining, first, the difficulties which the early settlers of the Great Plains experienced, and, second, the type of agriculture which they finally were forced to establish and upon which the present civilization of the region is based.

The early settlers of the Great Plains first tried to establish in the new country the kind of agriculture with which they had been familiar in Ohio, New York and other northeastern states. There were occasional temporary successes. These were achieved at times of unusually favorable weather conditions and when grasshoppers, the great crop pest of that time, were not dangerously numerous.

In such favorable circumstances corn, soft wheat and certain other crops that the settlers brought with them, yielded abundantly. But, upon the whole, it is correct to say that so long as the settlers depended upon their traditional farming methods and crop plants they failed. The story of the first three or four decades of settlement in the Great Plains region is a story of heroic struggle with a strange and difficult environment. The story contains a great deal of tragedy. The early failures made themselves felt not only in the new country but also "back East," as thousands of eastern people who held western mortgages learned to their sorrow.

The Role of Plant Immigrants

We cannot get a clear conception of the dominant factors in the transformation of the region unless we recognize the part played by plant immigrants. These have come from every continent that contains large areas having natural conditions similar to those in the Great Plains.

One of the earliest plant immigrants, and the most important in acreage and aggregate value, is hard red winter wheat of the Crimean type. This remarkable type of wheat was first brought to Kansas from Southwestern Russia by some Mennonite farmers in 1873. Since that time additional importations have been made by the United States Department of Agriculture and by other agencies. Scientific plant breeding work by the United States Department of Agriculture, by several of the state agricultural colleges, and by a few private individuals, has developed new strains of this type of wheat that are distinctly superior to the imported strains in winter hardiness, in ability to withstand or escape drouth, and in resistance to certain important fungus diseases. The area from which this type of wheat is harvested in Kansas and Nebraska alone averages more than eight million acres a year. Very large acreages of the same type of wheat are grown also in Texas, Oklahoma, Colorado and Montana. The substitution of this type of wheat for the soft wheat varieties that the early settlers tried to grow has made the wheat crop a relatively dependable one where formerly it failed more often than it succeeded. Kansas alone has produced an average of one hundred million bushels of wheat annually for the past twenty years. Farther north in the Great Plains, corresponding development of the wheat industry has resulted from the scientific work of

the United States Department of Agriculture, the agricultural colleges of the north-central states, and of the Canadian Department of Agriculture and Canadian agricultural colleges. The establishment, in the northern part of the Great Plains, of the hard spring wheat industry corresponds closely to the establishment of the hard winter wheat industry in the southern Great Plains.

As "Man cannot live by bread alone," neither can agriculture safely depend upon wheat alone. Important as hard winter wheat is, as a plant immigrant, it is not sufficient. The early settler of the Great Plains needed something to take the place that clover occupied in the agriculture with which he was familiar. The need has been largely supplied by alfalfa. The latter probably is the oldest plant to be cultivated solely for forage. It has been grown for centuries in Asia and in Southwestern Europe. But its first effective introduction into the United States was as late as 1854, when alfalfa was brought to California from the west coast of South America. The high feed value of alfalfa and the ability of the plant to withstand extremes of heat, cold and drouth, have made it one of the most important agricultural plants in the Great Plains region. It is grown on more than two million acres of land in Kansas and Nebraska, and on very large areas in adjacent states. It is one of the fundamental factors in the livestock industry of the Great Plains.

A large botanical group, known as the sorghums, has a place of high importance among the plant immigrants. This group contains many varieties, some grown chiefly for forage and others for grain. While some of the varieties of sorghum have been grown in the United States for more than two hundred years, those that are well adapted to conditions on the Great Plains have been brought into the country or have been produced here by plant breeding within the past sixty or seventy years, several of the best ones within the past twenty-five years. Most of the widely used varieties have been brought here by the United States Department of Agriculture. The regional adaptations of the different varieties have been determined and practicable methods of production and utilization have been worked out by the Federal department and the state agricultural colleges with the assistance of progressive farmers. It is interesting and significant that most of the sorghum varieties now used in the Great Plains region have descended from varieties which were brought into the country from places in Asia and Africa where natural conditions are essentially similar to those in the Great Plains, especially

as to the frequent occurrence of drouth and high temperatures during the growing season. The numerous varieties of sorghums are now grown successfully on millions of acres of land in the region which our grandfathers called the "Great American Desert."

One of the most interesting of the sorghums is Sudan grass. It deserves special mention on this occasion because its history illustrates a common and important feature of scientific work, namely, the productiveness of intelligent curiosity. The sorghum group is divided into two sub-groups. In one of these, the plants, like Johnson grass, produce rootstocks and are perennial. In the other, the plants produce no rootstocks and are annual. About twenty years ago Dr. C. V. Piper, of the United States Department of Agriculture, became curious to learn whether there existed anywhere in the world a sorghum that was like Johnson grass except that it would produce no rootstocks. He thought that such a plant might have special value in certain regions of the United States. After securing hundreds of samples of seed from many parts of the world he finally found one sample which produced plants without rootstocks. That sample came from Africa as recently as 1909 and was the progenitor in this country of what is now widely known here as Sudan grass. The plant was tested by the Federal department and by several agricultural colleges in the Southern Great Plains and was found to have remarkable value as a hay and pasture plant. It is sensitive to low temperatures but it thrives remarkably in hot, dry weather when most other crop plants do not grow at all. The value of the plant in the Great Plains region, especially from Nebraska southward, is indicated by the fact that in the past ten years the area annually devoted to its production in Kansas and Nebraska has increased from practically nothing to more than a quarter of a million acres. This plant immigrant, brought here as a result of an investigator's curiosity, is coming to be a mainstay for thousands of farmers in the Great Plains region in periods when heat and drouth would cause serious economic loss in the absence of such a plant.

Sweet clover is another plant immigrant that deserves special mention. This plant probably was first cultivated in Western Asia. It was brought to America about two hundred years ago but it was not extensively grown here until within the past thirty years. The history of sweet clover in this country is a curious one in that, until very recently, the plant was almost universally regarded, by both scientist and layman, as a dangerous weed. Within the past twenty-

five years many state laws have been enacted for the purpose of discouraging, or even prohibiting, the growth of sweet clover. But now that the value of the plant as a hay and pasture crop and as a soil improver has been fully demonstrated, sweet clover is not only respectable but popular. The farmers of a single county in Kansas recently seeded thirty thousand acres of sweet clover in one year.

Only a few of the important new crops and crop plant varieties have been referred to here. Many new varieties that are not mentioned have had an important effect in the reclamation of the region under discussion. The plant breeder and the plant explorer have given to the region varieties of oats, wheat, sorghum, corn and other farm crops that are peculiarly adapted to the natural conditions of the Great Plains. To secure these adapted varieties has required an enormous quantity of scientific work in plant introduction and plant breeding. While, as will be indicated later, the transformation of the "Great American Desert" has not resulted entirely from the introduction of new crops and new varieties, it is certain that plant immigrants have played a major part. In the importation, improvement, and establishment of these new crops and varieties both the scientist and the farmer have contributed liberally. The importance of new plants in the "Great American Desert" is indicated by the fact that in Kansas fully fifty per cent of the cultivated land is used for the production of crop plants that have been brought to the United States, or plant varieties that have been developed here by scientific plant breeding, since Captain Bonneville made his expedition across the region in the fourth decade of the nineteenth century.

Science Has Aided Farm Practice

In addition to great scientific achievements in the introduction and improvement of crop plants for use in the region there has been a vast amount of effective scientific work in the development of methods of producing and utilizing these plants. Every valuable new crop that has been brought here has required new methods of production and utilization. Many well established practices in the production of a given crop in the Northeastern United States are wholly inapplicable west of the Missouri river. This is true not only of new crops but also of the indigenous Indian corn. One of the sure ways of reducing the yield of corn in central Kansas, for

example, is to use commercial fertilizers as they are used by successful farmers in Ohio, Illinois or Pennsylvania. The peculiar natural conditions of the Great Plains require peculiar methods of crop production. Moreover, nearly every new crop brought into the region from foreign countries has required new methods of utilization. With some of these crops, like certain of the sorghums, it has been more difficult to develop satisfactory methods of utilization than it was to learn how to grow the crops successfully.

A good example of a farm practice that has been developed for use under conditions peculiar to the Great Plains is afforded by what is known as the lister method of planting. This method is used in planting corn and certain of the sorghums. It differs from the older method in that it plants the seed in the bottom of a furrow and leaves alternating furrows and ridges throughout the field instead of planting the seed near the top of the ground and leaving the surface smooth as the old method does. Under certain conditions common in the Great Plains, the lister method reduces the cost of preparing the land for seeding, facilitates and cheapens the control of weeds, reduces wind damage to the plants, and increases the plants' ability to withstand drought. The lister method was first used in Kansas about forty-five years ago. For fifteen or twenty years after its initial trial it was the subject of argument and experimentation. It is now well established. Its use on several million acres of land in the Great Plains is an important factor in the production of corn and the sorghums in that region.

The natural conditions of the Great Plains include important hazards that affect the agriculture of the region with peculiar force. Insect injury to crops has been one of the hazards with which the Great Plains settler has had to contend. The grasshopper has been particularly troublesome. The early settlers were powerless to combat this pest. Time after time the crops of whole counties were devastated by it. But now its depredations have been greatly reduced through the work of entomologists. As recently as 1919 a serious outbreak of grasshoppers occurred in western Kansas. Through the cooperation of the state agricultural college and the county and township officers and farmers of thirty-nine counties, a campaign of grasshopper eradication was conducted on the largest scale ever known in the world up to that time. The campaign covered 34,000 square miles. The poison bait used amounted to 183 car loads. It included 83 tons of white arsenic. The campaign

is estimated to have saved the farmers of the thirty-nine counties not less than $20,000,000, and possibly double that amount. Such a saving would have been impossible thirty years ago because up to that time science had not devised effective methods of controlling the insect. The contributions of science to the control of grasshoppers have been duplicated for several other important insect pests. There have been corresponding accomplishments in bringing certain destructive rodents under control. The virtual extermination of the prairie dog is an example. In the early days this interesting little animal maintained hundreds of prairie dog villages where now are rich pastures and productive crop lands. The prairie dog doubtless was partly responsible for a statement I have quoted from an early geography that "large tracts are often to be met with which exhibit scarcely a trace of vegetation," for he devastated the land he occupied and he occupied large areas. For his extermination, we are chiefly indebted to Lantz and Scheffer, formerly with the Kansas college and later with the United States Biological Survey. The same men and the same institutions have played a leading part in the fight against the gopher and the mole.

There is not time to recite in any detail the accomplishments of the plant pathologist in the control of plant diseases and of the animal pathologist in the control of diseases affecting farm animals. In collaboration with the plant breeder, the plant pathologist has produced disease-resistant varieties of crop plants and he has given us many effective preventive measures for use against certain of the fungus diseases of plants. The corresponding accomplishments of the animal pathologist include a virtually perfect method of preventing blackleg in cattle and a highly efficacious preventive against cholera in hogs.

It would be difficult to evaluate the significance of the contributions of science during the past thirty years in combatting the natural enemies of crop plants and of domestic animals. Without these contributions, the Great Plains region would be a vastly different place from what it now is, both economically and socially.

Mechanical Science Has Helped

Although the contributions of agricultural science in the transformation of the "Great American Desert" have been of incalculable value, they would have been largely ineffective in the absence of

corresponding contributions by mechanical science. Reference already has been made to a plan suggested in 1858 to "traverse the desert, if at all, with caravans of camels." The development of the locomotive and the coming of the railroads have made camels quite unnecessary! The region was peculiarly in need of adequate transportation facilities because it almost completely lacked timber for building operations and fuel. It is difficult to see how the region could have been satisfactorily settled without some efficient means of bringing timber into it. The coming of the railroads not only made camels unnecessary but it also removed whatever basis Lieutenant Pike had for fearing that the union could not be preserved if its inhabitants spread out across his "desert." When we imagine what the region would be without modern methods of transportation, we have little difficulty in understanding the skepticism of its early explorers regarding its suitability for settlement and agricultural development.

One of the characteristics that distinguish the agriculture of the Great Plains is the large average size of farm. Because of the relatively low yield per acre it is necessary that the farms be larger in this region than are the farms in the northeastern states. In 1920 the average size of farm was 275 acres in Kansas and 339 acres in Nebraska as compared with an average of 87 acres in Pennsylvania and 92 acres in Ohio. In some counties in Kansas and Nebraska the farms average almost a thousand acres in size. The relatively sparse population could not operate these farms as farms are operated in the older states of the East, where the farm unit is smaller and man labor more plentiful. The successful operation of the large farms of the Great Plains has been made possible through the development of farm machinery through which the efficiency of the individual farmer is increased several fold. The gang plow, the tractor, the grain binder, the header and the combined harvester and thresher are some of the important farm implements contributed by mechanical science within very recent years. These and other contributions of mechanical science in the development of farm machinery constitute an extremely important factor in the reclamation of the region.

Dominating Influence of the Human Factor

Underlying all other factors in the transformation that has taken

place in the region under discussion is the character of the people who have settled and reclaimed the country. One cannot too strongly emphasize the importance of this factor. The people who have used the contributions of agricultural and mechanical science in reclaiming the region have exhibited to a remarkable degree the qualities which characterize successful pioneers: a spirit of adventure, unshakable faith, an eagerness to try new methods, high intelligence, perseverance and unremitting industry. These qualities have been shown by settlers who have devoted themselves primarily to the production of crops, by the early cattlemen of the region, and by those who have been directly responsible for the building of the towns and cities. There is reason to believe that, in the absence of a people of the kind indicated, the region still would be regarded as virtually a desert.

Universal Negative to Be Avoided

Consideration of the factors that have dominated in the transformation of the "Great American Desert" not only increases appreciation of the value of the contributions made by agricultural and mechanical science, and of the heroic struggles of the people who settled the region; it also emphasizes the fallibility of those who use the "universal negative." Instead of saying that a certain thing never will be done, it is well for us to pause and consider how often such predictions have been erroneous when they were made eighty years ago for the "Great American Desert," although at that time they seemed reasonable and sound. The Great Plains region has not been fully developed. It is capable of supporting many additional millions of people and of contributing much more than it now does toward satisfying the material and social needs of the world. No doubt there will develop in this region many new agricultural industries and greatly improved practices in production, distribution and utilization of the output of new and existing industries. These changes may be expected to come as science gives us new plants, new facts, improved machines, and more efficient methods of distribution. Perhaps consideration of the story of this region may help some of us to be less positive in expressing unfavorable opinions regarding the future of the region or regarding the future of such places as the territory of Alaska or of other regions whose settlement and development now seem doubtful to many of us. The more we

learn of the achievements of science, of the force of economic pressure, and of the spirit of the pioneer, the less inclined we are to assert that anything is impossible.

REPORT OF THE TREASURER OF SIGMA XI FOR THE YEAR 1925

In January, 1925, in accordance with the instructions of the annual Convention of Sigma Xi in December, 1924, the Treasurer issued a call to all the chapters for the annual dues of seventy-five cents per chapter member and one dollar initiation fee for each new member. The dues of all the chapters except four, Union College (paid since), University of Nebraska, University of Michigan (chapter assessment only) and University of North Carolina were paid during the calendar year.

RECEIPTS

Chapter	*Assessment*	*Initiation Fee*	*Quarterly*	*Miscellaneous*	*Total*
Cash on hand					$3934.81
Cornell	$ 150.75	$ 51.00			201.75
Rensselaer	33.00	6.00			39.00
Kansas	60.75	18.00			78.75
Yale	81.75	67.00			148.75
Minnesota	178.50	40.00			218.50
Ohio	114.75	84.00			198.75
Pennsylvania	311.00	66.00			377.00
Brown	46.50	40.00			86.50
Iowa	77.75	78.00			155.75
Stanford	71.25	53.00			124.25
California	300.00	152.00			452.00
Columbia	71.25	61.00			132.25
Chicago	184.50	145.00		$ 2.85	332.35
Michigan		43.00			43.00
Illinois	174.25	70.00			244.25
Case	20.25	18.00			38.25
Indiana	50.25	4.00			54.25
Missouri	69.75	43.00			112.75
Colorado	54.75	23.00			77.75
Northwestern	49.50	22.00			71.50
Syracuse	50.25	13.00			63.25
Wisconsin	207.75	57.00			264.75
Univ. of Washington	58.50	30.00			88.50
Worcester	26.25	12.00			38.25
Purdue	57.75	13.00			70.75
Washington Univ.	90.50	1.00			91.50
Texas	38.25	5.00			43.25

RECEIPTS (CONCLUDED)

Chapter	*Assessment*	*Initiation Fee*	*Quarterly*	*Miscellaneous*	*Total*
Mayo Foundation	$40.50	$11.00			$51.50
North Dakota	21.00	11.00			32.00
Ames	70.50	1.00			71.50
Rutgers	40.50	12.00			52.50
McGill	73.50	5.00			78.50
Kentucky	27.75	21.00			48.75
Idaho	24.00	7.00			31.00
Swarthmore	9.75	18.00			27.75
Oregon	37.50	4.00			41.50
Virginia	24.75	8.00			32.75
Johns Hopkins	127.00	51.00			178.00
California Tech				$144.00	144.00
Missouri				50.00	50.00
Kansas				50.00	50.00
H. B. Ward				48.86	48.86
George B. Pegram				12.12	12.12
QUARTERLY			$76.00		
	$3126.50	$1364.00	$76.00	$307.83	$8809.14

DISBURSEMENTS

QUARTERLY—December, 1924	$ 120.83
QUARTERLY—March, 1925	381.90
QUARTERLY—June, 1925	434.24
QUARTERLY—September, 1925	179.63
Secretary's Office assistant	1219.88
Secretary's Office, general expenses	579.55
President's Office	535.56
Treasurer's Office	6.00
Travel Expenses—Executive Committee	472.42
American Telephone & Telegraph Co. (bond)	1037.44
Consolidated Gas Company (bond)	1002.90
American Telephone & Telegraph Co. (bond)	991.94
St. Louis and San Francisco Railroad (bond)	796.35
Collection charges	10.03
Total Disbursements	$7768.67
Cash on hand, Dec. 31, 1925	1040.47
	$8809.14

ALUMNI FUND

Total Receipts		$4735.00
Disbursements:		
Clerical Services	$206.25	
General expenses	9.25	
Travel expenses	22.90	
Research stipend	510.00	
Non-negotiable checks	10.00	
Total Disbursements	758.40	
Cash on hand, Dec. 31, 1925	$3976.60	
		$4735.00

December 31, 1925.

We have audited the accounts of the treasurer of the Society of Sigma Xi for the year ending December 31, 1925, and certify that the income shown by the books of the treasurer has been duly accounted for, that payments have been properly vouched and that the balance sheet and accounts submitted contain a true statement of the financial condition of the Society. We have also examined the securities in the hands of the treasurer and find the following bonds: $1000 American Telephone and Telegraph Co., $500 American Telephone and Telegraph Co., $1000 Consolidated Gas Co., and $1000 St. Louis-San Francisco Railway Co.

Date: April 5, 1926.

J. K. FINCH,
J. H. MORECROFT,
Auditors.

OFFICERS ELECTED AT THE DECEMBER CONVENTION

The new president of Sigma Xi, DR. F. R. MOULTON, was born in LeRoy, Michigan, April 29, 1872. He was graduated from Albion College with the degree of A.B. in 1894, he received the degree of Ph.D. from Chicago in 1899, and the degree of D.Sc. from Albion in 1922.

Following his graduation, Dr. Moulton was for two years an instructor in astronomy at Albion. In 1896 he became associated with the University of Chicago, holding the positions of associate in astronomy 1896–1898; assistant 1898–1900; instructor 1900–03; assistant professor 1903–08; associate professor 1908–12; professor 1912.

Dr. Moulton is a widely known popular lecturer on astronomy, and was lecturer at the Mathematical Colloquium in 1920.

He is a member of the National Academy of Sciences; Associate

F. R. Moulton

W. R. Whitney

of Arts; American Mathematical Society (Associate Editor of *Transactions* in 1908); Astronomical Society; American Academy of Arts and Sciences; Honorary Corresponding Member of the British Association; Fellow of the Royal Astronomical Society; Circolo Matematico di Palermo; American Philosophical Society; American Association for the Advancement of Science. He has been a member of Sigma Xi since 1903 and has taken a keen interest in the work of the Society.

In addition to numerous contributions to mathematical and astronomical journals, Dr. Moulton is the author of Celestial Mechanics, Introduction to Astronomy, Descriptive Astronomy, Periodic Orbits, and with Dr. T. C. Chamberlin is the author of Planetesimal Theory of Origin of Planets. He has in press a book on Ballistics which is an outgrowth of his service in the United States Army as head of Ballistics during the World War.

DR. WILLIS R. WHITNEY, the newly elected member of the Executive Committee, was born in Jamestown, N. Y., August 22, 1868.

He was graduated from the Massachusetts Institute of Technology, with the degree of S.B., in 1890, and in 1896 he received the degree of Ph.D. from Leipzig. In 1919 he received the honorary degree of Sc.D. from Union University, and of Ch.D. from the University of Pittsburgh.

After his graduation, Dr. Whitney held the following positions at the Institute of Technology: Assistant Instructor in Sanitary Chemistry, 1890–92; Instructor in Sanitary Chemistry, 1892–94; Instructor in Theoretical Chemistry and Proximate Analysis, 1898–01; Assistant Professor of Theoretical Chemistry, 1901–04; Non-resident Associate Professor of Theoretical Chemistry, 1904–08; Non-resident Professor of Chemical Research, 1908– .

Among his early activities, Dr. Whitney, in conjunction with Professor A. A. Noyes, successfully developed a recovery process for alcohol, and ether from collodion which insured the commercial practicability of the present photographic paper.

His most notable achievement has been the creation and development at Schenectady of the Research Laboratory of the General Electric Company, of which he has been director since 1900. To him is due in large measure the world-wide reputation which this laboratory has gained for the quality of its work and the importance of its results.

Among the papers which Dr. Whitney has personally published

are: Solubility Determinations, Colloids, Corrosion of Iron, Alloys, Chemistry of Light, Carbon Brushes, Vacua, Phenomena of Catalysis. His translation of Le Blancks Textbook of Electrochemistry is well known.

The Willard Gibb medal was awarded to Dr. Whitney in 1916, the Chandler medal in 1920 and the Perkin medal in 1921.

In addition to his membership in the Society, Dr. Whitney is a member of American Chemical Society (President in 1909), American Society of Chemical Engineers, American Electrochemical Society (President in 1912), American Institute of Mining and Metallurgical Engineers, American Institute of Electrical Engineers, American Physical Society, American Association for the Advancement of Science, American Academy of Arts and Sciences, National Academy of Sciences, British Institute of Metals and the National Research Council. He is also a member of the U. S. Naval Consulting Board.

Installation at New York University

The New York University Chapter of Sigma Xi was installed on March 20, 1926, by Dr. F. K. Richtmyer, Past-President of Sigma Xi, designated as installing officer by National President F. R. Moulton. Dr. C. E. McClung of the University of Pennsylvania, member of the National Executive Committee, Dean George B. Pegram of Columbia University, National Treasurer, and C. E. Davies, National Secretary (pro tem), were also present and assisted in the ceremony.

The meeting was called to order by Dr. Richtmyer at four o'clock in the Faculty Club on the campus of New York University at University Heights. Dr. Richtmyer read the petition from the group of Sigma Xi members at New York University and described the process followed by the Executive Committee in investigating the University and the possibility offered for a successful chapter. This culminated in the unanimous approval of the petition by the Convention of Sigma Xi at Kansas City on December 29, 1925.

Dr. Richtmyer then initiated into membership six of the petitioners who were not members of the Society.

Following the reading of the charter Dr. Richtmyer outlined the history of Sigma Xi and explained its purpose as the promotion of research by the election of qualified individuals to membership, by furnishing contacts between workers in science, and by public

addresses and lectures on scientific subjects. Dr. Richtmyer then delivered the charter to Dr. Holmes C. Jackson, President of the Sigma Xi Club at New York University, who expressed the appreciation of the group of petitioners of the award of the chapter and held out promise of results that would come from an active group of scientific workers at the University.

On motion, a unanimous ballot was cast for the following temporary officers for the new chapter: Chairman, Dr. Holmes C. Jackson; Vice-Chairman, Dr. George I. Finlay; Secretary-Treasurer, Dr. Horace W. Stunkard.

The rest of the afternoon was given over to a discussion of the various problems involved in the conduct of a Sigma Xi chapter. A committee was appointed to formulate the chapter by-laws.

The installation dinner was held in the Faculty Club, New York University, after which Dr. Holmes C. Jackson presided over a brief toast list. The first speaker was Dr. Richtmyer, installing officer, who congratulated New York University on its successful achievement of a chapter. Chancellor Elmer Ellsworth Brown greeted the new chapter and expressed his appreciation for the honor that had been thus conferred on the University. He told of the pioneer work done at the University in scientific investigation. Dean Archibald L. Bouton of the Graduate School spoke of the dangers of specialization in science and pleaded for a synthesis of the great mass of our present knowledge. The last speaker was Professor Arthur E. Hill, head of the Department of Chemistry, who expressed the gratification of the University faculty at the installation of the chapter.

The first public meeting of the new Chapter of Sigma Xi was given over to a lecture on "The Unity of Life" by Dr. C. E. McClung of the University of Pennsylvania. Dr. Jackson presided. Dr. McClung analyzed the many manifestations of life into their various fundamentals and traced the similarities of these fundamentals in all variations of living things. He pointed out that the unity of life could be adequately explained only on the basis of the evolutionary concept. His address was scholarly and interesting to the large attendance.

The list of the charter members of the new Chapter is as follows:

William Howard Barber
Helen C. Coombs
George Irving Finlay
Proviso V. Prewitt
John J. Ritter
Raemer Rex Renshaw

Ruth B. Howland
Charles E. Houghton
Arthur Edward Hill
John Charles Hubbard
Joseph Lewis Hyatt
Holmes Condict Jackson
Alexander Klemin
Charles Krumwiede
Henry James Masson
William Hallock Park
David Burr Porter
Joseph W. Roe
Harold D. Senior
Harold Horton Sheldon
Bertram G. Smith
George A. Stetson
Horace W. Stunkard
Edgar R. Wagner
George Barclay Wallace
W. Andrew Wesolowski
Horace E. Wood

C. E. Davies, *National Secretary, Pro Tem*

CHAPTER OFFICERS

LIST FURNISHED BY THE CORRESPONDING SECRETARIES OF THE CHAPTERS

CHAPTER	PRESIDENT	VICE-PRES.	SECRETARY	TREASURER
Cornell	W. B. Carver	Lewis Knudson	Robt. Matheson	C. C. Murdock
Rensselaer	A. W. Davison	L. W. Clark	E. M. Clark	W. J. Williams
Union	P. I. Wold	J. W. Mavor	C. B. Hurd	C. B. Hurd
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